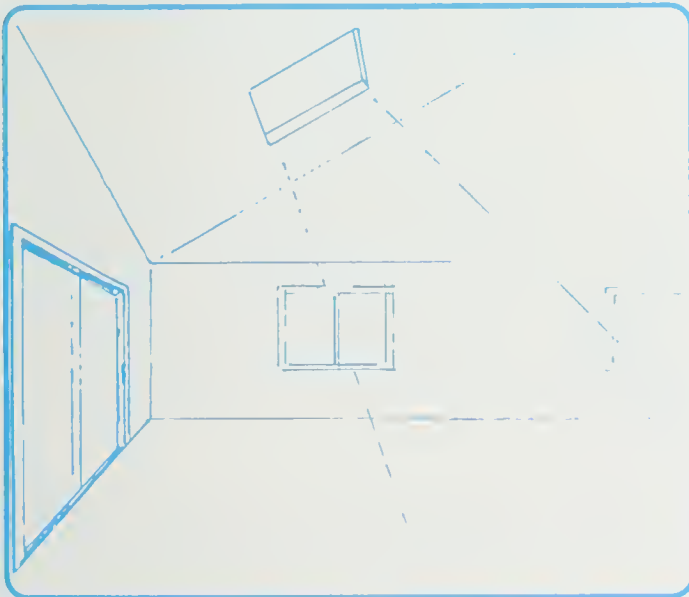


ENERGY NOTES

ENERGY-EFFICIENT LIGHTING

A cozy, well-lit home helps many Montanans enjoy the short days and long nights of winter, but keeping those lights burning can add a significant amount to energy bills. The lighting portion of a typical Montana electric bill averages between \$50 and \$150 per year. This cost can be driven up considerably by extensive outdoor lighting or if lights are left on all night. Fortunately, there are some fairly easy ways to reduce the cost of lighting a home. Some simple changes in behavior can help homeowners save a significant amount of money, and using a few of the several new energy-saving lighting technologies now available will help save even more.

USE DAYLIGHT INSTEAD OF ELECTRIC LIGHTS



Daylight is the ideal light source, both in terms of quality and energy use. A single skylight provides as much light as a dozen or more light bulbs, and the light quality is unsurpassed. However, too much natural lighting—especially if it causes glare—can be distracting, and, of course, this light is only available during the daytime.

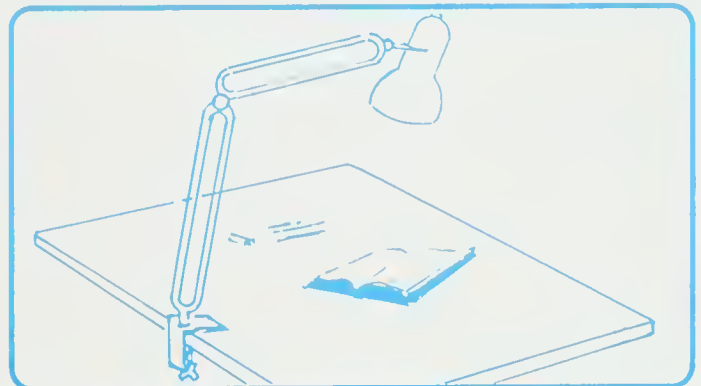
One of the simplest ways to increase use of daylighting is to rearrange furniture. Put a favorite reading chair by the

south window instead of in a dark corner. Paint choices also can increase the reflection of natural light. Paint walls lighter colors to help draw the light deeper into the room. Light colored rugs also help.

Homeowners might want to consider putting a skylight into an upstairs room. If there is an unheated attic above the ceiling, a light well with insulated walls may have to be installed to allow the light to get down into the room. Adding windows, of course, also can allow more daylight into a house, but windows can contribute to overheating in the summer and heat loss in the winter. This should be kept in mind when adding windows and skylights, and the plan should include either some type of summer shading device or use double-glazed windows with a low-emissivity coating. The best design balances passive solar heating, daylighting, and cooling considerations.

MATCH LIGHT TO FIT TASKS

Many people turn on ceiling lights upon entering a room. This practice can generate much more light than is needed for many tasks. Light intensity decreases dramatically with distance from the light source, which may lead to increasing the size of the light bulbs. A more energy-conscious solution is to concentrate light just where it is needed, then reduce background or ambient light levels. This usually will require much less light than given off by far-away ceiling lights. Office buildings commonly use this technique and it makes just as much sense at home. Track lighting may be used to illuminate a desk or kitchen table, or a small lamp can be used for a desk.



USE AUTOMATIC LIGHTING CONTROLS

For some situations, automatic lighting controls can help ensure that lights are on only when needed. Three of the most common lighting controls are described below:

Motion Sensors—Also called “occupancy sensors,” these devices turn on lights when people are present, then turn them off when they leave. They are often used on the exterior of homes to provide light when you’re getting out of your car or for nighttime security. They’re also useful in offices and in children’s rooms. Wall switches can be rewired and replaced with occupancy sensors.

Photocells and Timers—Time clocks or photocells can be used to turn on lights when home occupants are on vacation or to light interior or exterior for security when occupants return after dark. Time clocks turn lights on and off at a predetermined time. Photocells turn lights off during daylight hours and turn them on when it gets dark.

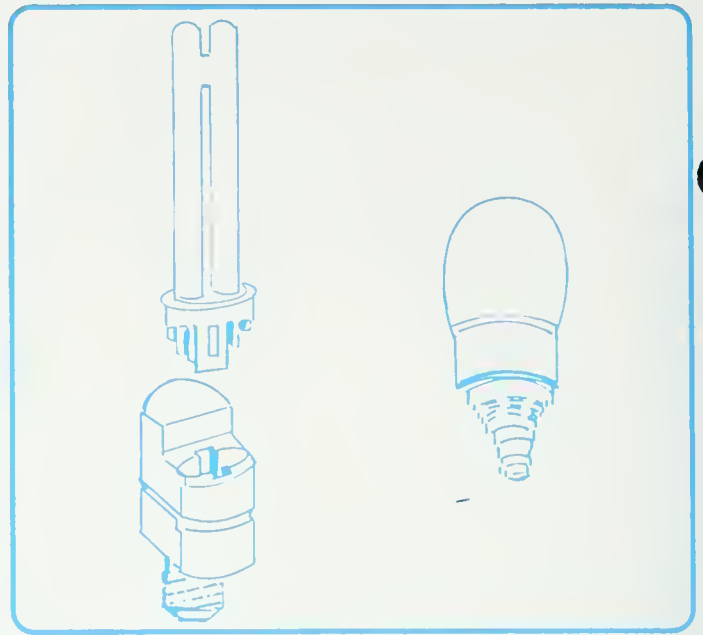
Programmable Switches—These will turn lights on and off at preset times. For instance, switches can be programmed to turn lights off ten minutes after they are turned on.

SWITCH TO COMPACT FLUORESCENT LIGHTS

Most houses use incandescent lamps, the familiar yellow “light bulbs” that have been around for decades. In an incandescent lamp, electric current flows through a wire filament, heating it to a very high temperature. Most of the energy emitted by the filament is in the form of heat—less than 10 percent ends up as visible light. During the winter, that’s an expensive form of heat, while during the summer it may require additional expensive air conditioning.

A fluorescent lamp works on an entirely different principle. Electrical current flows through a glass tube, ionizing the gas inside, which in turn energizes the phosphor coating on the inside surface of the glass tube to emit light. Some may remember fluorescent tubes from school days, along with their buzz, flicker, hum, and ghostly greenish-blue shade. Unlike the old-style inefficient fluorescents, today’s energy-efficient fluorescent lights can provide a warm light similar to that of incandescent bulbs.

The most popular of these new energy-efficient fluorescent lights are called “compact fluorescents.” Unlike the older long skinny fluorescent tubes, these compact fluorescents are smaller and folded over—in essence they are a miniature U-shape fluorescent tube. Screw-in compact fluorescents will fit many of the same fixtures used with incandescent light bulbs. Other energy efficient fluorescent lights are circular or long and straight, similar to the old-style fluorescent tubes in appearance but much more efficient.



Compact fluorescents can last up to ten times as long as their incandescent counterparts and consume less than a third of the energy to provide the same amount of illumination. A 15-watt compact fluorescent provides as much light as a 60-watt incandescent.

The initial cost of compact fluorescent is higher than incandescent bulbs, but incandescent bulbs commit users to spending another \$2.00 to \$5.00 over the life of the bulb in electricity. Ten incandescent bulbs will be needed to match the life of one compact fluorescent bulb. A compact fluorescent bulb, even though it may cost \$15.00 to \$20.00 initially, will save much more than that in energy and bulb replacement costs over several years.

When replacing incandescent bulbs with compact fluorescents, bulbs that are used most should be replaced first. The longer a particular light is operated each day, the faster a compact fluorescent replacement will pay for itself. Compact fluorescent bulbs are most cost effective when used in areas where they will be left on at least four hours a day. Switching a compact fluorescent off and on frequently during the day may reduce the life of the bulb, so use other bulbs in areas that are switched on and off frequently.

Compact fluorescent lamps generally are longer and wider at their base than incandescent lamps. Therefore, it is essential to measure the maximum width and length of a light bulb that a fixture can accommodate before purchasing a compact fluorescent lamp for it.

Although a few compact fluorescent lamps now on the market can be used with dimmers, most cannot, since they overheat when connected to a dimmer. Installation information should be checked carefully before using compact fluorescents with a dimmer. Compact fluorescent lamps can be screwed into three-way sockets, but they will operate only at full light output.

TIPS FOR SAVING MONEY ON HOME LIGHTING:

Go through your house and make a list of which lights are on the most. The most-used lights are the best candidates for replacement with compact fluorescent lights. Note that compact fluorescent lights can only be used in non-dimming circuits.

Measure the light fixtures for those most-used lights and then go to a lighting store or hardware store that carries a selection of compact fluorescent lights. Check the dimensions of the various types of compact fluorescents and buy one or two (don't buy a lot until you have made sure they will fit in your fixtures).

For situations where you need the highest quality light focused on a very specific area (such as a task light for your work area), consider tungsten halogen lights—either standard or low-voltage.

Make use of natural daylighting whenever possible—especially in rooms that are used a lot during the daytime. Rearrange seating closer to windows. In some situations you may need to rearrange your furniture to position your workspace or reading chair by a window or under a skylight.

To increase daylight into your rooms, trim shrubs outside your windows that block the sunlight.

Don't overlight. Select lower-wattage bulbs for areas that do not need bright light, such as hallways and storage areas.

Break the habit of automatically turning on a light when you enter a room. You may be surprised to find that daylight by itself is adequate for many of your daytime activities.

Keep your lights and shades clean. When dirt or some other obstruction blocks some of your light, you're needlessly paying for light that you can't see.

When you choose to continue using incandescent bulbs, use one high-wattage bulb in place of multiple low-wattage bulbs wherever possible. A 100-watt light bulb produces as much light as two 60-watt bulbs.

If you tend to keep outdoor lights on all night, buy and install a photo-sensor to turn lights on at dusk and off at dawn. Most hardware stores and building supply stores now carry these.

If you only need outdoor lighting for security purposes or an occasional errand outside at night, consider installing motion detectors to control the lights.

Substitute a 4-watt night light for the standard 7-watt night light—they use only half as much energy. This can be a worthwhile substitution considering the long hours that night lights burn.

When arranging your lights and furniture, avoid placing a lamp near your thermostat. Heat from the lamp could give the thermostat false temperature readings and cause your heating and cooling systems to run improperly.

If you need a lot of outside illumination (for a barn or garage, for example), consider replacing incandescent lights with HID lights (either high-pressure sodium or metal halide).

Call your electric cooperative to see whether they offer any incentives or assistance for purchasing compact fluorescent lights for residential or commercial buildings.

The ballasts on older-style fluorescent bulbs sometimes caused electronic interference with radios, telephones or other electric devices. Newer designs have reduced or eliminated this problem.

Until recently it was difficult for retail consumers to find compact fluorescents, but they are now available at most hardware and retail outlets. Purchase of such bulbs at these stores will reinforce the store's managers decision to stock this new item. If they do not carry compact fluorescents, they should be encouraged to do so. The yellow pages under "Light Bulbs and Tubes" may show sources of fluorescent lights.

USE INCANDESCENT BULBS EFFECTIVELY

In many situations it will be more economical to switch to compact fluorescents than to keep incandescent bulbs. However, there are techniques to make even incandescent bulbs more energy efficient.

Higher-wattage incandescent light bulbs are more efficient than lower-wattage bulbs. It takes two 60-watt bulbs or four 40-watt bulbs to provide as much light as a single 100-watt bulb. In a fixture that holds several bulbs, use of a single higher-wattage bulb instead of several smaller bulbs will save energy (precautions on the fixture about maximum wattage should be followed).

"Watt Miser," "Supersaver," or "Econo-Watt" incandescent bulbs, available from the major lamp manufacturers, use 5-13 percent less energy than standard incandescent bulbs. They sometimes cost a little more, but that extra cost is more than made up for through energy savings. Halogen lights offer even greater savings, and they last longer.

Avoid the "energy-saver" buttons that are widely promoted for saving energy and extending incandescent bulb life. They do reduce energy use, but they reduce light output even more, so more bulbs will be needed to provide the needed amount of light.

Use three-way incandescent bulbs when possible. They make it easier to keep lighting levels low when bright light is not necessary. The high switch should be used only for reading or other activities that require high light levels. Three-way bulbs are also available in "Energy Saver" versions.

Use tungsten-halogen bulbs for task lighting at a desk or other areas that require high-intensity focused lighting.

CONSIDER THE LARGER BENEFITS OF ENERGY EFFICIENT LIGHTING

Not only can the energy savings from energy efficient lighting be dramatic, but the overall benefits to society are great. If a single 75-watt incandescent light bulb is replaced with a compact fluorescent, about 570 kilowatt hours of energy will be saved over the lifetime of the compact fluorescent bulb. Multiply that energy saved by the hundreds of thousands of inefficient light bulbs that could be replaced with compact fluorescents in the United States, and it is obvious that a significant amount of energy is being wasted on inefficient lighting. Using lighting more efficiently reduces energy consumption and can help reduce the need to construct expensive new hydropower plants or other energy generating sources. Delaying construction of new electrical generation plants can help keep electrical bills down.

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